



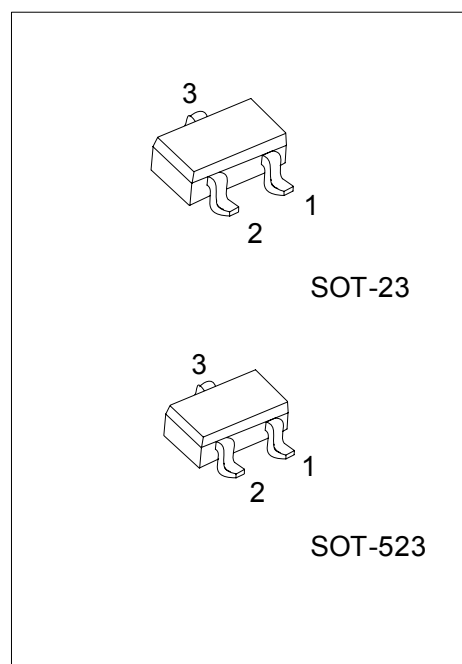
MMBT2222A

NPN SILICON TRANSISTOR

NPN GENERAL PURPOSE AMPLIFIER

FEATURES

* This device is for use as a medium power amplifier and switch requiring collector currents up to 500mA.



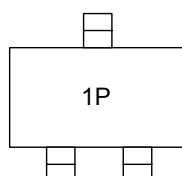
*Pb-free plating product number:MMBT2222AL

ORDERING INFORMATION

Order Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
MMBT2222A-AE3-R	MMBT2222AL-AE3-R	SOT-23	E	B	C	Tape Reel
MMBT2222A-AN3-R	MMBT2222AL-AN3-R	SOT-523	E	B	C	Tape Reel

MMBT2222AL-AE3-R	(1)Packing Type (2)Package Type (3)Lead Plating	(1) R: Tape Reel (2) AE3: SOT-23, AN3: SOT-523 (3) L: Lead Free Plating, Blank: Pb/Sn
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MARKING



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C, unless otherwise specified.)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Base Voltage		V_{CBO}	75	V
Collector-Emitter Voltage		V_{CEO}	40	V
Emitter-Base Voltage		V_{EBO}	6	V
Collector Current		I_C	0.6	A
Power Dissipation	SOT-23	P_C	350	mW
	SOT-523		150	mW
Junction Temperature		T_J	+150	
Storage Temperature		T_{STG}	-55 ~ +150	

Note: These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Thermal Resistance, Junction to Ambient	SOT-23	θ_{JA}	15	°C/W
	SOT-523		833	°C/W

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified.)

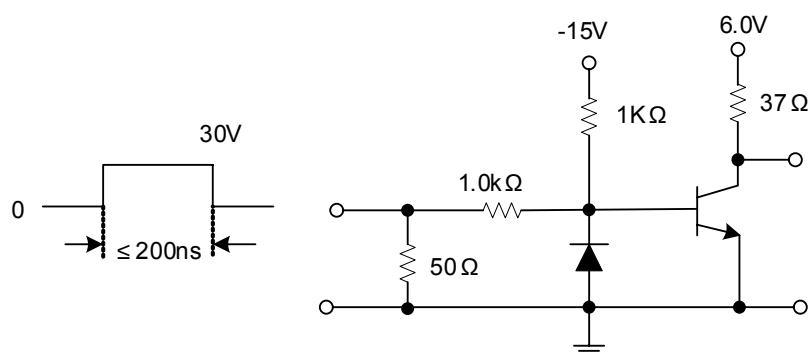
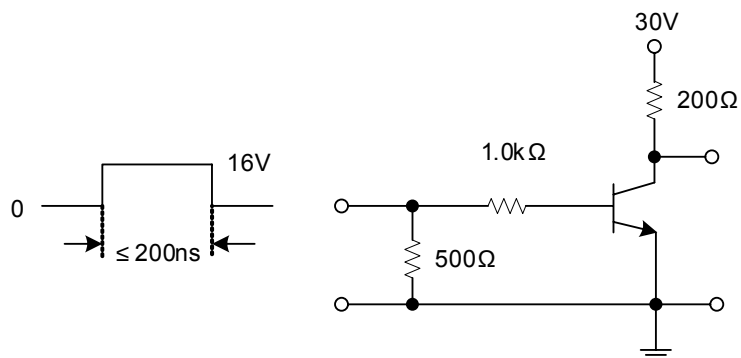
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	75			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	I _E =10μA, I _C =0	6			V
Collector Cutoff Current	I _{CBO}	V _{CB} =60V, I _E =0 V _{CB} =60V, I _E =0, Ta=150°C			0.01 10	μA μA
Emitter Cutoff Current	I _{EBO}	V _{EB} =3.0V, I _C =0			10	nA
Base Cutoff Current	I _{BL}	V _{CE} =60V, V _{EB(OFF)} =3.0V			20	nA
Collector Cutoff Current	I _{CEO}	V _{CE} =60V, V _{EB(OFF)} =3.0V			10	nA
ON CHARACTERISTICS						
DC Current Gain	h _{FE}	I _C =0.1mA, V _{CE} =10V I _C =1.0mA, V _{CE} =10V I _C =10mA, V _{CE} =10V I _C =10mA, V _{CE} =10V, Ta= -55°C I _C =150mA, V _{CE} =10V* I _C =150mA, V _{CE} =1.0V* I _C =500mA, V _{CE} =10V*	35 50 75 35 100 50 40		300	
Collector-Emitter Saturation Voltage*	V _{CE(SAT)}	I _C =150mA, I _B =15mA I _C =500mA, I _B =50mA			0.3 1.0	V V
Base-Emitter Saturation Voltage*	V _{BE(SAT)}	I _C =150mA, I _B =15mA I _C =500mA, I _B =50mA	0.6		1.2 2.0	V V
SMALL SIGNAL CHARACTERISTICS						
Real Part of Common-Emitter High Frequency Input Impedance	Re(h _{je})	I _C =20mA, V _{CB} =20V, f=300MHz			60	Ω
Transition Frequency	f _T	I _C =20mA, V _{CE} =20V, f=100MHz	300			MHz
Output Capacitance	C _{obo}	V _{CB} =10V, I _E =0, f=100kHz			8.0	pF
Input Capacitance	C _{ibo}	V _{EB} =0.5V, I _C =0, f=100kHz			25	pF
Collector Base Time Constant	rb'C _c	I _C =20mA, V _{CB} =20V, f=31.8MHz			150	pS
Noise Figure	NF	I _C =100μA, V _{CE} =10V, R _s =1.0kΩ f=1.0kHz			4.0	dB

■ ELECTRICAL CHARACTERISTICS(Cont.)

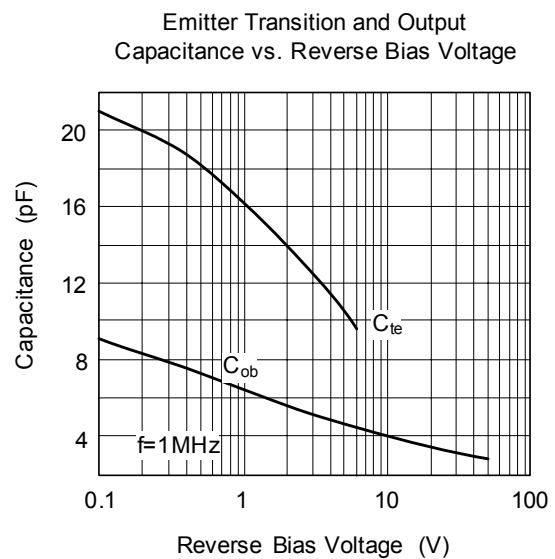
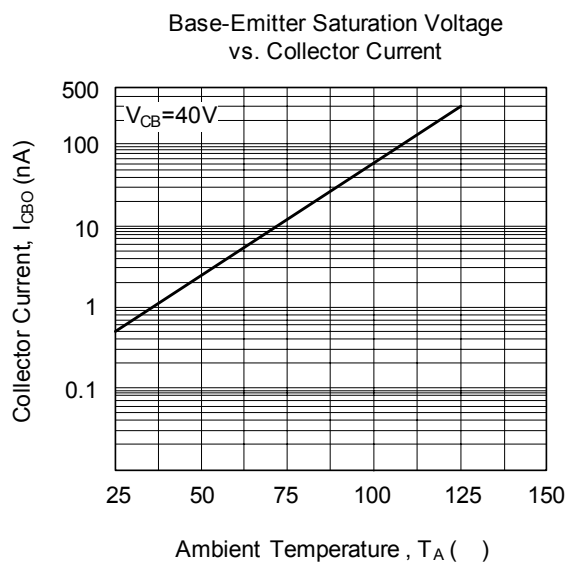
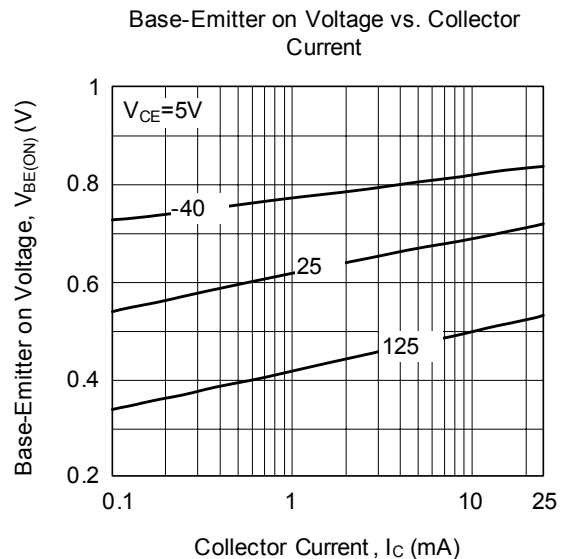
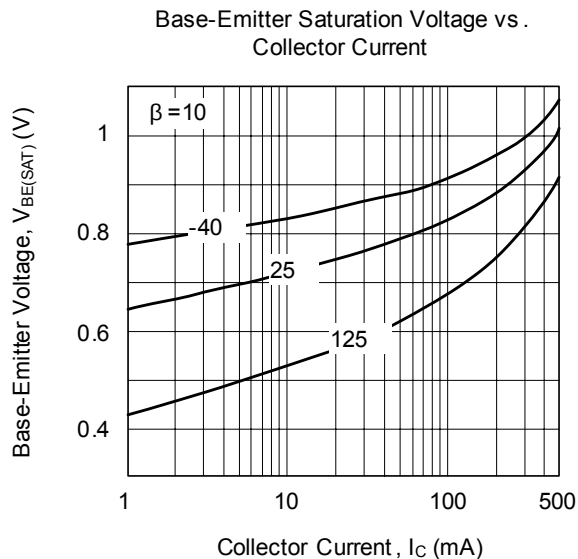
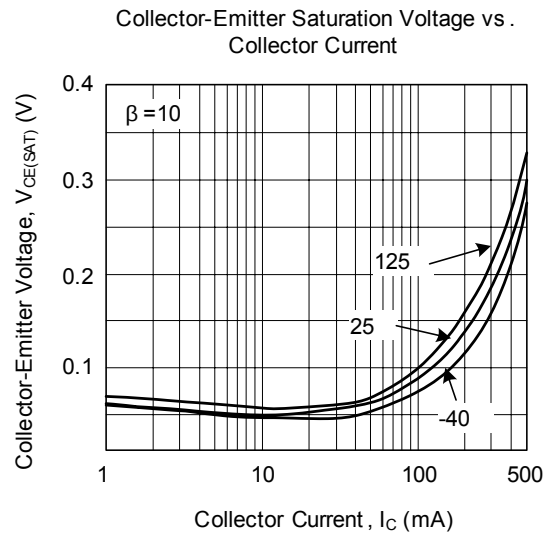
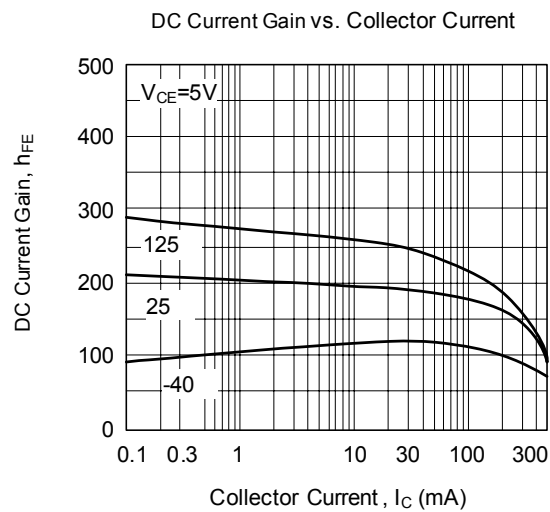
SWITCHING CHARACTERISTICS						
Delay Time	t_D	$V_{CC}=30V, V_{BE(OFF)}=0.5V,$			10	ns
Rise Time	t_R	$I_C=150mA, I_{B1}=15mA$			25	ns
Storage Time	t_S	$V_{CC}=30V, I_C=150mA$			225	ns
Fall Time	t_F	$I_{B1}=I_{B2}=15mA$			60	ns

*Pulse test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2.0\%$

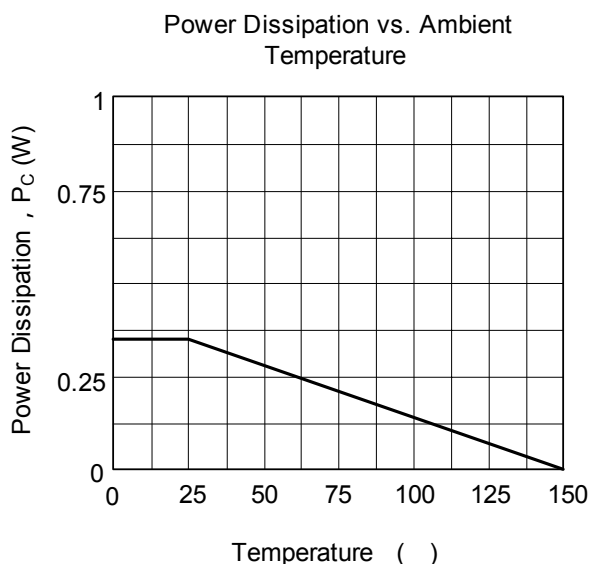
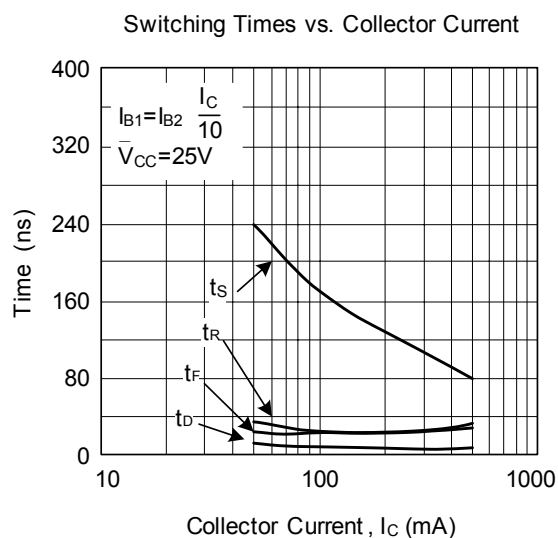
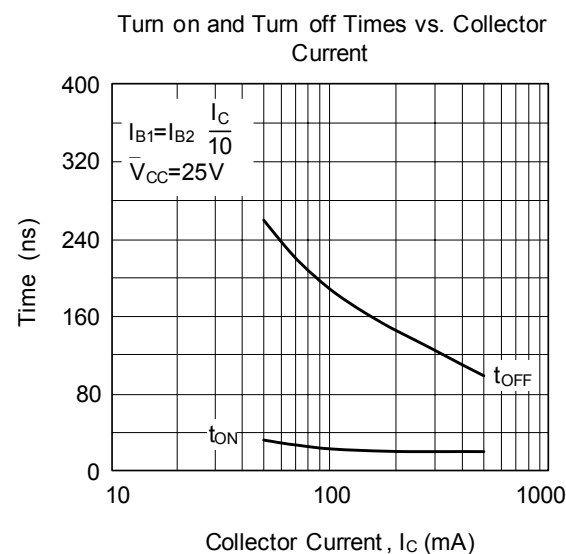
■ TEST CIRCUITS



■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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